FIVE-YEAR REVIEW REPORT

CHISMAN CREEK SUPERFUND SITE

NEWPORT NEWS, YORK COUNTY, VIRGINIA

PREPARED BY:
U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION III

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9/30/94 Date
I. INTRODUCTION

Section 121 (c) of the Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA"), as amended by the Superfund Amendments and Reauthorization Act ("SARA") and Section 300.430 (f) (4) (ii) of the National Contingency Plan ("NCP"), require that Five-Year reviews are to be conducted at sites where hazardous substances, pollutants or contaminants remain at the site above levels that will not allow for unlimited use or unrestricted exposure following the completion of all remedial actions for the site. The purpose of such a review is to assess whether remedial actions implemented at the site continue to be protective of human health and the environment. On September 30, 1986, the U.S. Environmental Protection Agency ("EPA") issued the OU-1 Record of Decision ("ROD") for the Chisman Creek Site. In addition, EPA issued an Explanation of Significant Differences ("ESD") on March 22, 1994.

EPA has established a three-tier approach to conducting Five-Year Reviews, the most basic of which provides a minimum protectiveness evaluation (Level 1 review). EPA contemplates that a Level 1 review will be appropriate for most sites unless the site specific circumstances suggest otherwise. The second and third levels (Levels II and III) of review are intended to provide flexibility to respond to varying site-specific considerations, including the nature of the response action, the status of on-site response activities and the proximity to populated areas and sensitive environmental areas. EPA has determined that a Level I review is appropriate for this site.

II. SITE HISTORY AND CONDITIONS

The Chisman Creek Superfund Site ("Site") is located in Southeastern York County, Virginia, in a 520 acre sub-watershed of the Chisman Creek Coastal Basin on the Virginia Peninsula. Chisman Creek is a tributary to Chesapeake Bay. The Site consists of four abandoned sand and gravel pits that were filled with fly ash from the Virginia Power, (formerly Virginia Electric and Power Company), Yorktown Power Generating Station.

The four fly ash disposal pits (hereinafter called Areas A, B, C, and D) are located adjacent to Wolftrap Road (State Road 630), approximately 0.7 miles northeast of the intersection of Route 630 and U.S. Route 17 (See Figure 1). The southernmost pit, Area A, is approximately 13.5 acres in area and is bordered on the west by the former York County municipal landfill and on the east by Route 630. Area B, approximately 4.5 acres, is 700 feet north of Area A and is bordered on the east and west by intermittent streams. Area C, approximately 12.9 acres, is 500 feet northeast of Area B, and is bordered by Route 630 to the west and by Chisman Creek to the northeast. Area D, approximately 5 acres, is 150 feet northwest of Area C and is bordered to the east by
Route 630. Parts of Areas A and C are elevated between 5 and 20 feet above the surrounding land. The relief of Areas B and D is similar to that of the surrounding land.

In 1957 and 1958, two units of the Virginia Power began burning coal mixed with coke from a nearby petroleum refinery. Fly ash was produced from these units until 1974, when Virginia Power converted them to burn fuel oil. Virginia Power contracted with a hauler to remove and dispose of residues, cinders, and fly ash generated at the Yorktown Station. Large quantities of this waste were transported and deposited in four abandoned sand and gravel pits one mile north of Grafton in Southeastern York County, Virginia. During heavy rains, fly ash and other sediments washed from the pits into the tributaries of Chisman Creek. The fly ash waste also affected the groundwater beneath the disposal areas.

In 1980, a private drinking well on Wolftrap Road, adjacent to the four fly ash pits, was reported to contain discolored water. The Virginia State Water Control Board and Virginia State Board of Health began sampling groundwater from the residential wells in the vicinity of the Site to determine the types and concentrations of contaminants affecting the local water. These tests revealed elevated levels of heavy metals in the groundwater, surface water, and soils in and around the disposal areas. As a result of the data gathered and conclusions drawn by these studies, the site was included on the National Priorities List ("NPL") in 1983.

EPA organized its remedial cleanup activities at the Site into two operable units. OU-1 consists of four abandoned sand and gravel borrow pits ("Areas A-D") that were filled with fly ash generated at the Yorktown Station. Operable Unit 2 ("OU-2") consists of three ponds ("Ponds A-C"), a freshwater tributary stream, and the Chisman Creek estuary. The ponds are located west of Wolf Trap Road immediately north of Area A. The tributary consists of two branches in the area of the ponds, with the confluence of the branches near Pond C. From the confluence of the two branches, the tributary flows eastward under Wolf Trap Road, along the north face of Area C, and into the Chisman Creek estuary.

The Remedial Investigation/Feasibility Study

In 1985, EPA completed the Remedial Investigation ("RI") to determine the nature and extent of contamination at the Site. The RI did not detect any organic contaminants that could be attributed to the fly ash at the Site. The contamination due to inorganic materials was found to be localized in and around the
area of the fly ash pits, with contaminants present in the fly ash itself, in the sediments of Chisman Creek and its tributaries, in groundwater within and adjacent to the ponds, and in pond and stream waters tributary to Chisman Creek.

Soil and sediment samples taken during the RI from the fly ash disposal pits were found to be contaminated with vanadium, nickel, arsenic, beryllium, copper and selenium. Levels of vanadium and nickel comparable to those detected in the fly ash disposal pits were also found in sediments from two of the three ponds directly north of Areas A and B. Elevated levels (up to 50 times background) of vanadium and nickel were also detected in sediments from nearby parts of the tributary stream channels, while adjacent areas of the Chisman Creek estuary showed concentrations of nickel above 100 ppm.

Shallow groundwater downgradient of Areas A and C exhibited elevated levels of nickel and beryllium, and molybdenum, respectively. Arsenic, chromium, copper, selenium, and vanadium were also detected, at slightly higher levels, downgradient of one or more of the disposal pits.

Contaminated surface water was identified in two of the three ponds north of Areas A and B and in tributary channels downstream of the fly ash disposal pits. Vanadium, at concentrations exceeding 10 times the background levels, was detected in the ponds north of Areas A and B and in the stream channel adjacent to Area C. Slightly elevated levels (approximately 2 times the detection limits) of nickel were also founds in the stream channel adjacent to Area C, while similar levels of molybdenum were detected in each of the two ponds. Surface waters elsewhere in the study area were otherwise free of detectable contamination.

Total Dissolved Solids (“TDS”) and sulfate, which occur naturally at relatively high concentrations in the Chisman Creek estuary, were also elevated in groundwater within the immediate vicinity of the fly ash pits and in tributary channels downstream of these pits. Groundwater within, beneath, and in the immediate vicinity of the fly ash disposal pits had concentrations of TDS and sulfate that were above the Secondary Maximum Contaminant Levels (“SMCL”) of 500 and 250 ppm, respectively and which significantly exceeded general background levels.

On August 27, 1986, the Feasibility Study (“FS”) for OU-1 was released for public comment. Based on the data obtained from the RI, the OU-1 Feasibility Study evaluated various alternatives for Site clean-up.
III. REMEDIAL OBJECTIVES

The objectives in the OU-1 ROD included the prevention of human exposure to the on-site fly ash, and the ingestion of groundwater, as well as the protection and restoration of wetlands. To address these objectives, the remedy selected in the OU-1 ROD contained the following components:

- Installation of a low-permeable soil cap in the area of the filled sand and gravel pits designated as Areas A, B, and C. Area D warranted no remedial action since the fly ash originally placed there had been removed and placed at Area C in the early 1970's;
- Collection of contaminated groundwater from Area C and treatment at an on-site treatment plant;
- Installation of an alternate water supply to homes along Wolf Trap and Allens Mill Road;
- Placement of deed restrictions or other land use controls at each of Areas A through D, including the prohibition of excavation and building on-site, and restriction of ground water use; and
- Initiation of Post-closure monitoring of ground and surface water.

The discharge of contaminated ground water to a publicly owned treatment works ("POTW") was initially considered as a viable remedial alternative. However, at the time the OU-1 Feasibility Study was conducted, the Hampton Roads Sanitation District ("HRSD") indicated that the existing POTW, the York River Wastewater Treatment Plant, was not willing to accept wastewater from a CERCLA site. Consequently, this remedial alternative was screened from further consideration.

Based on 4 years of analytical data collected on-site, the HRSD and the existing POTW rescinded their previous decision not to accept ground water from the Site for treatment at the York River Wastewater Treatment Plant. As a result, the HRSD and the POTW agreed to accept ground water from the site for treatment at the York River Wastewater Treatment Plant in York County, Virginia. In addition, the York County Department of Environmental Services approved a connection from the on-site treatment plant to the York County Sanitary Sewer System.

The decision to connect the existing on-site collection system to the local POTW replaces that portion of the OU-1 remedy which
called for the on-site treatment of contaminated ground water and its subsequent discharge to the Chisman Creek non-tidal tributary. While these changes do not represent a fundamental departure from the selected OU-1 remedy, they modify a portion of the OU-1 remedial action. As a result, EPA issued an ESD for OU-1 on March 22, 1994 to reflect this change.

IV. Applicable or Relevant and Appropriate Requirements Review

In accordance with the ROD and terms of a Consent Decree, the Responsible Party, Virginia Power, was required to construct an on-site water treatment facility before effluent discharge standards could be developed. In anticipation of exceedingly low effluent limitations that would be necessary to ensure compliance with the Commonwealth of Virginia’s Marine Water Quality Standards, Virginia Power agreed to design and construct the on-site water treatment plant. Construction activities were initiated in November, 1987, and were completed in December, 1988. As documented in Superfund Site Interim Closeout Report, dated December 21, 1990, all construction activities were completed to EPA’s specifications and met the full intention of the OU-1 ROD.

In order to ensure that effluent discharge from the water treatment facility would meet the Commonwealth of Virginia’s Marine Water Quality Standards, EPA identified Applicable Relevant and Appropriate Requirements (“ARARs”). These ARARs were chosen to control the flow of treated effluent to Chisman Creek and to ensure that the expected concentrations of arsenic, cadmium, copper, lead, nickel, selenium and zinc in the treated effluent were within established Marine Water Quality Standards. Consistent with the OU-1 ROD and the established ARARs, the groundwater beneath Area C was collected in a subsurface drainage system, treated on-site and thereafter discharged to a tributary of the Chisman Creek.

As a result of EPA’s issuance of the ESD in March 1994, the original ARARs established for the on-site treatment plant are no longer effective. In place of those requirements, the Industrial Wastewater Discharge Permit issued by HRSD has specified pre-treatment discharge limits which must be met for the contaminants at the Site. The complete listing of the pre-treatment limits, sampling and monitoring requirements and data submittal requirements are contained in the Wastewater Discharge Permit which has been entered into the Chisman Creek Site Administrative Record.
V. Summary of Site Visits

Beginning in October 1989, quarterly Site visits have been performed by the EPA Remedial Project Manager, a representative of the Virginia Department of Waste Management ("VDWM"), and Virginia Power to monitor the integrity of the capped areas on-site, and to ensure compliance with the Operation and Maintenance Plan for the Site. Trip Reports which document conditions found at the Site during these visits are provided to EPA by Virginia Power in monthly status reports.

VI. Sampling and Analysis

As part of the Post Closure monitoring program, a Consolidated Monitoring Plan ("CMP") was developed. A complete listing of the sample collection, and data reporting requirements to monitor the Site and the treatment plant effluent are contained in the CMP. Results of influent and effluent sampling are provided to EPA by Virginia Power in monthly status reports.

The resultant analytical data accumulated during the four-year period of the on-site plant operation indicates that ground water quality had improved since installation of the selected remedy, but that treatment would still be required. The data also indicates that ground water collected from Area C is suitable for direct discharge into the existing municipal sanitary system (the York County sanitary sewer system) because the untreated effluent meets the existing POTW’s established pre-treatment requirements.

VII. Recommendations

None.

VIII. Statement of Protectiveness

EPA certifies that the remedy selected for OU-1, including the changes documented in the ESD, remains protective of human health and the environment.

IX. Next Review

Since Site conditions do not allow for unlimited use or unrestricted exposure under current conditions, EPA will conduct another Five Year Review of the Chisman Creek Site by September 1999.
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